

Do You Know Your Blood Pressure? Your Brain Depends on It

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✓ Fact Checked

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STORY AT-A-GLANCE

- › Nearly half of American adults (47%) have high blood pressure, which increases your risk for heart disease, stroke, kidney disease and dementia
- › 95% of seniors between the ages of 60 and 90 have lesions in the white matter of their brains, and those with high blood pressure tend to have more white matter lesions and a higher risk for dementia in their later years
- › Some research suggests intensive blood pressure treatment to reach a systolic blood pressure goal of 120 mm Hg can limit the progression of age-related brain damage, thereby lowering your risk for dementia
- › While those in the intensive treatment group of one study suffered less brain damage (lesions) over time, they ended up losing a greater total volume of brain matter. The cause for this discrepancy is unknown, and it's unclear what the clinical significance might be
- › Clinical blood pressure guidelines now call for a blood pressure goal of 120/80. Elevated blood pressure or prehypertension is defined as a systolic blood pressure between 120 and 129. Stage 1 high blood pressure is 130 and 139 systolic, and 80 to 89 diastolic. Stage 2 high blood pressure is anything over 140 systolic and 90 diastolic

This article was previously published August 29, 2019, and has been updated with new information.

According to the Centers for Disease Control and Prevention,¹ 47% of American adults (about 116 million people) have high blood pressure, but only 24% have it under control – a condition which increases your risk for a number of serious health problems, including heart disease, stroke,² kidney disease³ and dementia.⁴

With regard to dementia, previous research⁵ has found that high blood pressure disrupts regulatory mechanisms in your brain by impeding blood flow, thereby causing neuronal damage and dysfunction.

A study⁶ published in the August 2019 issue of JAMA concluded intensive blood pressure treatment helped limit the progression of cerebral small vessel ischemic disease – referring to common age-related changes in the small blood vessels in your brain⁷ – thereby lowering the risk for dementia.

Other common terms for this condition is "white matter disease" and "age-related white matter changes."⁸ Previous research⁹ has found 95% of seniors between the ages of 60 and 90 have lesions in the white matter of their brains, and several studies¹⁰ have shown people with high blood pressure tend to have more white matter lesions and a higher risk for dementia in their later years.

Intensive Blood Pressure Treatment May Lower Dementia Risk

In the featured JAMA study,^{11,12} participants were randomly selected to receive intensive treatment to reach a systolic blood pressure goal of 120 mm Hg, or standard treatment, which required maintaining systolic blood pressure below 140 mm Hg.

The primary outcome was the change in total volume of white matter lesions from baseline. The secondary outcome was the change in total brain volume. Follow-up was scheduled to take place at four-year intervals, but the study was stopped early, after just five years, as the primary outcome benefit for those in the intensive treatment group was deemed to be higher, leaving those in the standard treatment group at a disadvantage. According to the authors:¹³

"In the intensive treatment group, based on a robust linear mixed model, mean white matter lesion volume increased from 4.57 to 5.49 cm³ (difference, 0.92 cm³) vs an increase from 4.40 to 5.85 cm³ (difference, 1.45 cm³) in the standard treatment group (between-group difference in change, -0.54 cm³)."

Curiously, while those in the intensive treatment group suffered less brain damage (lesions) over time, they ended up losing a greater total volume of brain matter. The cause for this discrepancy is unknown, and it's unclear what the clinical significance might be.

In the end, the researchers deemed the reduction in brain lesions to be more important, at least in terms of protecting against dementia. As noted in the study:¹⁴

"Mean total brain volume decreased from 1134.5 to 1104.0 cm³ (difference, -30.6 cm³) in the intensive treatment group vs a decrease from 1134.0 to 1107.1 cm³ (difference, -26.9 cm³) in the standard treatment group (between-group difference in change, -3.7 cm³).

Among hypertensive adults, targeting an SBP of less than 120 mm Hg, compared with less than 140 mm Hg, was significantly associated with a smaller increase in cerebral white matter lesion volume and a greater decrease in total brain volume, although the differences were small."

Dr. Walter J. Koroshetz, director of the National Institute of Neurological Disorders and Stroke, which funded the study, commented on the findings in an NIH press release:¹⁵

"These initial results support a growing body of evidence suggesting that controlling blood pressure may not only reduce the risk of stroke and heart disease but also of age-related cognitive loss. I strongly urge people to know your blood pressure and discuss with your doctors how to optimize control. It may be a key to your future brain health."

Do You Have High Blood Pressure?

A blood pressure reading gives you two numbers. The upper or first number is your systolic blood pressure reading. The lower or second number is your diastolic pressure. For example, a blood pressure reading of 120 over 80 (120/80 mm Hg) means you have a systolic arterial pressure of 120 and a diastolic arterial pressure of 80.

Your systolic pressure is the highest pressure in your arteries. It occurs when your ventricles contract at the beginning of your cardiac cycle. Diastolic pressure refers to the lowest arterial pressure, and occurs during the resting phase of your cardiac cycle.

The guidelines for healthy blood pressure appear to be a bit of a moving target, having gone through a bewildering number of changes over the past several years.¹⁶ In 2014, the blood pressure goal for healthy patients over 60 was 150/90, and 140/90 for those between the ages of 18 and 59.^{17,18,19}

As of 2017, American College of Cardiology and American Heart Association's clinical guidelines call for a blood pressure goal of 120/80.^{20,21,22} Elevated blood pressure or prehypertension is defined as a systolic blood pressure between 120 and 129.

Stage 1 high blood pressure is 130 to 139 systolic, and 80 to 89 diastolic. Stage 2 high blood pressure is anything over 140 systolic and 90 diastolic. Anything over 180 systolic and/or 120 diastolic is considered a hypertensive crisis.

As noted in a 2019 review²³ in the Cleveland Clinic Journal of Medicine, the 2017 guidelines increased the number of American adults diagnosed with high blood pressure at that time from 31.9% to 45.6%. Today, as mentioned in my introduction, even more – nearly half – of U.S. adults have high blood pressure. The latest guidelines also recommend monitoring your blood pressure continuously with a wearable device during daytime hours. As explained by Harvard Health:²⁴

"This additional monitoring can help to tease out masked hypertension (when the blood pressure is normal in our office, but high the rest of the time) or white coat hypertension (when the blood pressure is high in our office, but normal the rest of the time)."

Lowered Blood Pressure Guidelines Have Their Risks

According to the Cleveland Clinic Journal of Medicine review,²⁵ more intensive blood pressure control – meaning meeting the lower 120/80 threshold – "has the potential to significantly reduce rates of morbidity and death associated with cardiovascular disease." Alas, this reduction comes "at the price of causing more adverse effects."

According to this review, "All told, about 3 million Americans could suffer a serious adverse effect under the intensive-treatment goals." Serious side effects experienced by people receiving intensive treatment were higher rates of:²⁶

- Low blood pressure (hypotension) 2.4% versus 1.4% in the standard treatment group
- Fainting (syncope or temporary loss of consciousness) 2.3% versus 1.7%
- Electrolyte abnormalities 3.1% versus 2.3%
- Acute kidney injury or kidney failure 4.1% versus 2.5%
- Other treatment-related adverse events 4.7% versus 2.5%

How to Get a Proper Blood Pressure Reading

To avoid a false hypertension diagnosis, keep in mind that your blood pressure reading can vary significantly from day to day, and even from one hour to the next, so don't overreact if you get one high reading here or there. It's when your blood pressure remains consistently or chronically elevated that significant health problems can occur. The following variables can also affect the validity of your blood pressure reading:

- **The blood pressure cuff size** – If you're overweight, taking your reading with a size "average" blood pressure cuff can lead to a falsely elevated blood pressure reading, so make sure your doctor or health care professional is using the right size cuff for your arm.

- **Your arm position** — If your blood pressure is taken while your arm is parallel to your body, your reading will be falsely elevated. Blood pressure readings should always be taken with your arm at a right angle to your body.
- **Stress** — "White coat hypertension" is a term used for when a high blood pressure reading is caused by the stress or fear associated with a doctor or hospital visit. This can be a transient yet serious concern. If this applies to you, stress reduction is key.

To decrease your risk of being falsely diagnosed with hypertension in this situation, take a moment to calm down (be sure to arrive for your appointment ahead of time so you can unwind), then breathe deeply and relax when you're getting your blood pressure taken.

Common Causes for High Blood Pressure

Several factors have been identified as contributing to high blood pressure, including but not limited to:

Insulin and leptin resistance — As your insulin and leptin levels rise, it causes your blood pressure to increase.²⁷ As noted in one study:²⁸

"Insulin can increase blood pressure via several mechanisms: increased renal sodium reabsorption, activation of the sympathetic nervous system, alteration of transmembrane ion transport, and hypertrophy of resistance vessels. Conversely, hypertension can cause insulin resistance by altering the delivery of insulin and glucose to skeletal muscle cells, resulting in impaired glucose uptake."

Elevated uric acid levels — Like insulin and leptin, high uric acid is also significantly associated with high blood pressure, so any program adopted to address high blood pressure needs to normalize your uric acid level as well. Tellingly, uric acid is a

marker for fructose toxicity, so one effective way to do this is to minimize fructose in your diet.

Poor nutrition in childhood has been shown to raise the risk of high blood pressure in adulthood.²⁹

Lead exposure³⁰

Air pollution – Air pollution affects blood pressure by causing inflammation. According to one 2019 study,³¹ "the enhanced exposure to PM2.5 by 10 µg/m³ leads to an increase of systolic and diastolic blood pressure by 1-3 mmHg and is associated with a hazard ratio of 1.13 for the development of arterial hypertension."

Noise pollution – Noise pollution can also affect your blood pressure, primarily by activating stress responses that affect your autonomic and endocrine (hormonal) systems. As noted in one 2017 study:³²

"Chronic annoyance causes stress characterized by increased levels of stress hormones such as cortisol and catecholamines. Chronic stress may in turn cause a number of pathophysiological adaptations, such as increased blood pressure, increases in heart rate and cardiac output ..."

Key Lifestyle Strategies for Lowering Your Blood Pressure

In my experience, elevated blood pressure – even stage 1 and 2 high blood pressure – can be successfully addressed with lifestyle interventions, to where drugs become unnecessary. The key is to be sufficiently aggressive in your diet and lifestyle modifications.

That said, if you have seriously elevated blood pressure, it would be wise to take a medication to prevent a stroke while you implement these lifestyle changes. Below, I'll review several suggestions that can help lower your blood pressure naturally.

Address Insulin Resistance

As mentioned, high blood pressure is typically associated with insulin resistance,³³ which results from eating a diet too high in sugar. As your insulin level elevates, so does your blood pressure.³⁴

There are several reasons for this. For starters, insulin stimulates magnesium uptake.³⁵ If your insulin receptors are blunted and your cells grow resistant to insulin, you cannot store magnesium so it passes out of your body through urination.

To ascertain whether insulin/leptin resistance is at play, be sure to check your fasting insulin level. Aim for a fasting insulin level of 2 to 3 microU per mL (mcU/mL). If it's 5 mcU/mL or above, you definitely need to lower your insulin level to reduce your risk of high blood pressure and other cardiovascular health problems.

Keep in mind that the so-called "normal" fasting insulin level is anywhere from 5 to 25 mcU/mL, but please do not make the mistake of thinking that this "normal" insulin range equates to optimal.

Avoid Fructose

Aside from raising your insulin, fructose also elevates uric acid, which drives up your blood pressure by inhibiting nitric oxide in your blood vessels. (Uric acid is actually a byproduct of fructose metabolism. In fact, fructose typically generates uric acid within minutes of ingestion.)

If you're healthy and want to stay that way, the general rule is to keep your total fructose intake to 25 grams per day or less. If you're insulin resistant and/or have high blood pressure, keep your total fructose to 15 grams or less per day until your condition has resolved.

Eat Real Food

Being high in sugar, unhealthy seed oils and synthetic chemicals, a processed food diet is a recipe for high blood pressure. Instead, make whole, ideally organic foods the focus of your diet. This will address not only insulin and leptin resistance but also elevated uric acid levels.

Removing as much dangerous omega-6 from your diet is far more important than lower sugar in your diet, although the two ingredients typically are consumed together in most processed foods. It is also important to know that nearly all foods, sauces and salad dressings in every restaurant are loaded with seed oils, so best to avoid most restaurants.

Other leading foods with high levels of omega-6 include obviously all seed oils but even most olive and avocado oils that are adulterated with seed oils. Use butter, tallow or even coconut oil to cook with. Chicken and pork are also loaded with omega-6 because of the food they are given to eat. Most all seeds and nuts except macadamia nuts should be avoided.

One 2010 study³⁶ discovered that those who consumed 74 grams or more per day of fructose (the equivalent of about 2.5 sugary drinks) had a 77% greater risk of having blood pressure levels of 160/100 mmHg. Consuming 74 grams or more of fructose per day also increased the risk of a 135/85 blood pressure reading by 26%, and a reading of 140/90 by 30%.

According to the authors, "These results suggest that high fructose intake, in the form of added sugar, independently associates with higher [blood pressure] levels among U.S. adults without a history of hypertension."

Also remember to swap nonfiber carbs for healthy fats such as avocados, butter made from raw grass fed organic milk, organic pastured egg yolks, coconut oil, raw nuts such as pecans and macadamia, grass fed meats and pasture raised poultry. To learn more about healthy eating, please see my optimal nutrition plan, which will guide you through the necessary changes step-by-step.

In addition to what you eat, when you eat can also have a significant impact on your insulin sensitivity (and hence blood pressure). Intermittent fasting is one of the most effective ways I've found to normalize your insulin/leptin sensitivity. It's not a diet in conventional terms, but rather a way of timing your eating in such a way as to promote efficient energy use.

Increase Your Nitric Oxide Levels

Nitric oxide helps your vessels maintain their elasticity, so nitric oxide suppression increases blood pressure. A specific food that has been found to have a beneficial effect on blood pressure is beetroot juice,³⁷ thanks to its ability to convert the nitrate in the beetroot juice into bioactive nitric oxide.

In one small placebo-controlled trial,³⁸ one glass (250 milliliters or 8.5 ounces) of beetroot juice per day for one month reduced blood pressure in those diagnosed with high blood pressure by a mean of 7.7/2.4 mm Hg when measured in a clinic setting, and 8.1/3.8 mm Hg when measured at home. The treatment group also saw a 20% improvement in endothelial function. Arterial stiffness was also reduced.

Optimize Your Magnesium and Sodium-to-Potassium Level

Magnesium inhibits high blood pressure³⁹ by combating inflammation, relaxing your arteries and helping prevent thickening of your arteries, allowing for smoother blood flow. Magnesium stored in your cells relaxes muscles, including your blood vessels. If your magnesium level is too low, your blood vessels will constrict, thereby raising your blood pressure.

According to one scientific review,^{40,41} which included studies dating as far back as 1937, low magnesium appears to be the greatest predictor of heart disease, and other recent research⁴² shows even subclinical magnesium deficiency can compromise your cardiovascular health.

Your sodium-to-potassium level is also a crucial factor.⁴³ According to Lawrence Appel, lead researcher on the DASH diet and director of the Welch Center for Prevention, Epidemiology and Clinical Research at Johns Hopkins, your diet as a whole is the key to controlling hypertension – not salt reduction alone.

He believes a major part of the equation is this balance of minerals – i.e., most people need less sodium and more potassium, calcium and magnesium. In a 2014 interview, he told USA Today,⁴⁴ "Higher levels of potassium blunt the effects of sodium. If you can't reduce or won't reduce sodium, adding potassium may help. But doing both is better."

Indeed, maintaining a proper potassium to sodium ratio in your diet is very important, and hypertension is but one of many side effects of an imbalance. A processed food diet virtually guarantees you'll have a lopsided ratio of too much sodium and too little potassium. Making the switch from processed foods to whole foods will automatically improve your ratios.

Optimize Your Omega-3 Index

Research also highlights the importance of animal-based omega-3 fats for healthy blood pressure – especially in young adults.

In one 2018 study,⁴⁵ those with the highest serum levels of omega-3 also had the lowest blood pressure readings. On average, their systolic pressure was 4 mm Hg lower and their diastolic pressure was 2 mm Hg lower compared to those with the lowest omega-3 blood levels.

The best way to boost your omega-3 is to eat plenty of oily fish that are low in mercury and other pollutants. Good options include wild caught Alaskan salmon, sardines and anchovies. Alternatively, take a high-quality krill oil supplement.

For information about how to measure your omega-3 level, what the ideal level is and how your omega-3 index affects your risk for heart disease, see the hyperlink above.

Optimize Your Vitamin D Level

Vitamin D deficiency, associated with both arterial stiffness and hypertension,⁴⁶ is another important consideration. According to researchers from the Emory/Georgia Tech Predictive Health Institute,⁴⁷ even if you're considered generally "healthy," if you're deficient in vitamin D then your arteries are likely stiffer than they should be.

As a result, your blood pressure may run high due to your blood vessels being unable to relax. In their study, having a serum level of vitamin D lower than 20 nanograms per milliliter (ng/ml) was considered a deficiency state that raises your hypertension risk. Less than 30 ng/ml was deemed insufficient.

Previous research⁴⁸ has also shown that the farther you live from the equator, the higher your risk of developing high blood pressure. Blood pressure also tends to be higher in winter months than during the summer. Exposing your bare skin to sunlight affects your blood pressure through a variety of different mechanisms, including the following:

- Sun exposure causes your body to produce vitamin D. Lack of sunlight reduces your vitamin D stores and increases parathyroid hormone production, which increases blood pressure.
- Vitamin D deficiency has also been linked to insulin resistance and metabolic syndrome, a group of health problems that can include insulin resistance, elevated cholesterol and triglyceride levels, obesity and high blood pressure.
- Research⁴⁹ shows that sun exposure increases the level of nitric oxide in your skin. This dilates your blood vessels, thereby reducing your blood pressure. (For comparison, and to show how various factors tie together, uric acid, produced when you eat sugar/fructose, raises your blood pressure by inhibiting nitric oxide in your blood vessels – the opposite effect of sun exposure.)
- Vitamin D is also a negative inhibitor of your body's renin-angiotensin system (RAS), which regulates blood pressure.⁵⁰ If you're vitamin D deficient, it can cause inappropriate activation of your RAS, which may lead to high blood pressure.

Exposure to ultraviolet rays is also thought to cause the release of endorphins, chemicals in your brain that produce feelings of euphoria and relief from pain. Endorphins naturally relieve stress, and stress management is an important factor in resolving high blood pressure.

Exercise Regularly

A comprehensive fitness program can go a long way toward regaining your insulin sensitivity and normalizing your blood pressure. To reap the greatest rewards, I recommend including high-intensity interval exercises in your routine.

While the nitric oxide dump I previously promoted is OK to do, I have learned a far superior strategy that not only increases nitric oxide but also increases muscle strength. It is called blood flow restriction training and I should have detailed instructions and videos on this in the next month.

Strength training is particularly important if you're insulin resistant. When you work individual muscle groups, you increase blood flow to those muscles, and good blood flow will increase your insulin sensitivity.

I also recommend training yourself to breathe through your nose when exercising, as mouth breathing during exercise can raise your heart rate and blood pressure, sometimes resulting in fatigue and dizziness.

Address Pollution and Stress

Smoking is known to contribute to high blood pressure, as are other forms of air pollution, and even noise pollution. To address these, avoid smoking, consider using ear plugs during sleep if you live in a noisy neighborhood (provided you cannot move), and take steps to improve your indoor air quality.

The connection between stress and high blood pressure is also well documented, yet still does not receive the emphasis it deserves. Suppressed negative emotions such as

fear, anger and sadness can severely limit your ability to cope with the unavoidable every day stresses of life.

It's not the stressful events themselves that are harmful, but your lack of ability to cope. The good news is, strategies exist to quickly and effectively transform your suppressed, negative emotions, and relieve stress.

My preferred method is the **Emotional Freedom Techniques (EFT)**, an easy to learn, easy to use technique for releasing negative emotions. EFT combines visualization with calm, relaxed breathing, while employing gentle tapping to "reprogram" deeply seated emotional patterns.

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